

"A hand held cable reel"

5 This invention relates to hand held cable reels and in particular to hand held cable reels of the type comprising a central cable receiving core mounted between a pair of disc like end flanges.

10 Hand held cable reels have been used for many years in a variety of different fields. Typically though, cable reels are used to store a length of cable such as wire, garden water hose, electrical cable or tape in a safe and secure manner until such time that the cable is required. When the cable is required for use the desired amount of cable may be paid out gradually from the cable reel in an orderly manner. When the desired amount of cable has been paid out, the cable may be secured to the cable reel to prevent further payout of cable from the reel. Once the cable has served its purpose and is no longer required it may be reeled back up onto the cable reel until needed once again.

15 It will be understood that throughout this specification the term cable will be used which is to include wire, fabric, tape, electric cable or plastics material that may be wound on a reel. Also included under the term cable are lengths of rope, hosepipe or chain. Indeed any cable-like material that may be wound around the hand-held reel is encompassed within the term cable.

20 One such known type of cable reel is that disclosed in US patent number 3481557 (Miller). This device shows a masons line reel that may be used for paying out and retrieving line from the reel. One disadvantage of this device is that it is relatively unwieldy and difficult to wind or unwind line from the reel in a quick and efficient manner. This is due to the fact that the spacing between the handles is such that this cable reel will have a tendency to oscillate back and forth when being wound up which results in difficulties in winding the cable onto the cable reel neatly in a quick manner. Another disadvantage of this type of reel is that the handles protrude from the end flanges by a significant distance thereby hindering compact storage of the device. In addition to the above, cleats have to be provided to prevent inadvertent payout of the line from the reel when the reel is not in use. This increases the cost of producing such a reel. A further disadvantage of this type of cable reel is that the cable reel will be difficult to wind or unwind quickly due to the fact that the turning knob for manipulating the cable reel will be relatively difficult to operate.

Another known type of cable reel is that shown in US patent number 4022398 (Youngblood). This cable reel is used to store hosepipe. When the hosepipe is wound around the cable reel, the end of the hosepipe is secured in place by passing one end of the hose through a hole in the flange of the cable reel. Although relatively simple to construct this type of cable reel has the disadvantage that it is often difficult to wind the cable back onto the reel due to the type of handle used as well as the relative positioning of the handles. Furthermore, in order for this type of cable reel to secure a length of electrical cable, the holes in the flanges must be sufficiently wide enough to allow the through passage of a plug on the end of the cable. By having holes of this size, the flange is significantly weakened thereby resulting in a less robust cable reel. Secondly, the plug will protrude from the outer surface of the cable reel where it can be damaged should the cable reel be subjected to any sort of impact when in a stowed configuration. Although this reel goes some way towards obviating the disadvantages of other known reels, this reel is still relatively unwieldy and difficult to operate in a quick and efficient manner.

One other known type of hand-held cable reel is that described in the applicants own co-pending PCT patent application number WO 02/49949. This cable reel is effective in allowing cable to be paid out or reeled in relatively quickly with little difficulty. However, the cable reel requires a significant amount of space for storage and additional means to prevent inadvertent payout of cable from the reel must be provided. Furthermore, there will be a tendency for the cable reel to oscillate from side to side caused by the winding or unwinding of the cable onto the reel.

Another problem with the known types of cable reel is the manner in which the cables are secured about the reels particularly when the cable reel is not in use. Various devices have been proposed to secure the cable in position on the cable reel. Generally, these consist of clips that are secured directly onto the cable adjacent it's end so that once the cable has been wound up, it can be clipped onto an adjacent piece of cable already wound about the cable reel. These have been found to be effective in securing the cable in position. However, a disadvantage of this type of clip is that they are quite delicate and prone to breakage. By their very nature they are exposed when the cable is unwound from the reel and are prone to being stood on and trampled by unwary operators of the cable reel.

There are also additional problems with other known types of cable reel. Very often, the amount of cable stored on the cable reel will be substantial and together with the cable reel may weigh as much as between twenty to thirty kilos. The cable reel becomes unwieldy and difficult to manipulate and must be placed on the ground before rolling the cable reel along the ground about it's disc like end flanges in order to unravel or wind up the cable about the reel. Due to the fact that the end flanges are necessarily greater in diameter than the cable receiving core, when winding the cable up about the reel, slack forms in the cable. This slack leads to loosely stored cable that may result in all the cable not being protected by the end flanges when in a stored position. Furthermore the loosely packed cable can be difficult to subsequently unravel and if left unattended may lead to kinks forming in the cable. In order to prevent the build up of slack the operator of the cable reel must manually drag the cable reel backwards along the ground to tighten the cable about the cable receiving core before the cable reel may be rolled along the ground again. This is often very difficult and tiring to do particularly when a large amount of cable is to be wound about the cable reel.

When the cable is being paid out from the cable reel the opposite effect on the cable is produced and the cable becomes taut as the end flanges are rolled along the ground. This leads to slippage of the cable reel along the ground and can lead to damage to the cable reel. This can also lead to the cable reel becoming unwieldy and difficult to manipulate and the cable reel will tend to veer off to one side or the other instead of holding a straight line. Alternatively, certain types of cable may be stretched or otherwise damaged by placing the cable under tension which is undesirable.

Another problem with certain known types of cable reel, and in particular those types of cable reel that have a pair of handles rotatably mounted on the cable reel to enable the cable to be wound or unwound about the core, is that during the winding motion the cable reel will have a tendency to oscillate from side to side. This can lead to the cable becoming built up at one end and being distributed unevenly on the cable reel which can lead to problems subsequently when unraveling the cable.

It is an object therefore of the present invention to provide a cable reel that overcomes at least some of these difficulties that is both inexpensive to produce and simple to operate.

It is a further object of the present invention to provide a cable reel that may be stored in a compact manner.

Statements of Invention

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According to the invention there is provided a hand-held cable reel comprising a central cable receiving core mounted between a pair of disc like end flanges, each disc like end flange having a handle mounted on the outermost surface of the flange, the handles being radially offset from the central axis of the cable receiving core and circumferentially offset relative to each other, characterised in that

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each handle further comprises a substantially o-shaped grip portion having a body portion bridging a pair of inwardly depending arms, the free end of each of the arms facing the flange upon which it is mounted, each handle being rotatably mounted on its respective flange.

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By having the handles shaped and oriented in this way the tendency of the cable reel to oscillate from side to side when the cable is being reeled in will be reduced. This will provide a cable reel that is much easier to manipulate and cable may be wound thereon in an orderly fashion. In addition to this, the cable reel will be more compact and will take up considerably less space when stored away.

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In another embodiment of the invention there is provided a hand held cable reel in which each of the handles further comprises a base portion, the base portion being connected to the free ends of each of the arms of the grip portion so that the grip portion and the base portion are arranged to form a loop for reception of at least one finger of an operator therethrough, the base portion in turn being rotatably mounted on the flange. This is seen as a particularly robust configuration of cable reel.

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In a further embodiment of the present invention there is provided a hand-held cable reel in which the base portion and the grip portion are arranged to form a closed loop, the closed loop being substantially elliptical in shape. By having an elliptical shape, the handle will be able to be grasped in a most secure manner which will facilitate the winding and unwinding of cable from the reel, thereby further speeding up the process of winding and unwinding

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cable. This is seen as highly advantageous to users of the reel particularly those frequently using the hand held cable reel.

5 In one embodiment of the invention there is provided a hand-held cable reel in which the grip portion is hingedly mounted on the base portion. By having the grip portion hingedly mounted on the base portion, the grip portion may be laid flat along the base portion and hence the cable reel may be stowed in a more compact manner.

10 In one embodiment of the invention there is provided a hand-held cable reel in which the grip portion is flattened and/or may be provided with at least one ridge projecting outwardly therefrom to aid in location of the operators fingers about the grip portion. This will facilitate gripping of the handles by the operator.

15 In another embodiment of the invention there is provided a hand-held cable reel in which there is provided means to releasably secure the grip portion in position relative the base portion. This will provide a stable and rigid grip for the operator of the device. This means could be provided by way of an over centre spring, a spring loaded lock or a twist lock.

20 In one embodiment of the invention there is provided a hand-held cable reel in which the grip portion is releasably secured to the base portion. This will further allow the cable reel to be dismantled and packaged away using as little space as possible.

25 In another embodiment of the invention there is provided a hand held cable reel in which there is provided a gripping member connected to the handle to releasably secure the cable reel to a wire. This is seen as particularly useful as the gripping member will facilitate connection of the cable reel onto a wire fence or the like in a simple manner that will not require further ties and the like to be provided.

30 In a further embodiment of the present invention there is provided a hand held cable reel in which the gripping member further comprises a v-shaped hook having a pair of legs connected to each other, one of the legs being connected to the handle. This is seen as a simple construction of gripping member that will cause the wire that has been introduced into the v-shaped hook to be drawn inwards towards the bottom of the v-shaped hook thereby further securing the wire in position.

5 In one embodiment of the invention there is provided a hand held cable reel in which the grip portion is provided with a cut to allow through passage of a wire internal the loop formed by the grip portion and the handle portion, the grip portion being so dimensioned to form an acute angle at the point of contact with the base portion for reception of a piece of wire.

10 In another embodiment of the invention there is provided a hand-held cable reel comprising a central cable receiving core mounted between a pair of disc like end flanges, each disc like end flange having a handle mounted on the outermost surface of the flange, the handles being radially offset from the central axis of the core and circumferentially offset relative to each other, characterised in that

15 at least one of the handles further comprises a shaft cranked intermediate its ends to form an L-shaped handle, the proximal end of which is hingedly attached to the flange and the distal end forming a hand grip, the handle being pivotable about the hinge to and from an operating position in which the hand grip protrudes laterally from the flange and a storage position in which the hand grip extends from one flange across the core to the other flange.

20 By having such a hand-held cable reel the handle will be movable to and from an operating position in which the hand grip protrudes laterally from the flange and the storage position in which the handgrip extends from one flange across the core to the other flange. When the handle is in a storage position inadvertent unwinding of the cable will be prevented.

25 Furthermore, the cable reel may be packaged away in a compact, secure manner.

In a further embodiment of the present invention there is provided a hand-held cable reel in which the L-shaped handle is movable through an angle of approximately 180°.

30 In one embodiment of the invention there is provided a hand-held cable reel in which the flange opposite the flange upon which the L-shaped handle is mounted is provided with means to releasably secure the L-shaped handle in a storage position.

In another embodiment of the invention there is provided a hand-held cable reel in which the flange opposite the flange upon which the L-shaped handle is mounted is cam shaped and that flange is provided with a receiving hole for receiving the end of the grip portion of the L-shaped handle and releasably securing the L-shaped handle in a storage position.

- 5 This is seen as a particularly efficient way of retaining the L-shaped handle in a storage position. Furthermore, it is simple and inexpensive to manufacture. Alternatively, the L-shaped handle could itself be cranked further adjacent its free end thereby obviating the need for a cam shaped flange. A circular flange with a receiving hole would be required to receive the free end of the L-shaped handle that had been cranked further adjacent its free end.
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In a further embodiment of the present invention there is provided a hand-held cable reel in which the means to lock the L-shaped handle in position comprises a spring lock.

- 15 In one embodiment of the invention there is provided a hand-held cable reel in which there is provided a plurality of circumferentially spaced holes spaced apart on each flange and at least one bollard on each flange for securing the cable, thereby preventing further payout of the cable. This is seen as a particularly simple and efficient way of securing the cable once the desired amount of cable has been paid out from the reel. The cable may be
- 20 lead through one of the holes in a loop which in turn is lead around the bollard. This prevents inadvertent unwinding of the cable.

- In another embodiment of the invention there is provided a hand-held cable reel in which the bollard has a corrugated groove across its width for reception of a cable therein. By
- 25 having a corrugated groove additional protection against slippage of the cable will be provided which will be particularly useful when using 110/220 volt type cable.

- In a further embodiment of the present invention there is provided a hand-held cable reel in which there is provided an inner circle cut-out on at least one flange and a toothed section
- 30 of the inner circle cut-out for securing a piece of cable and preventing further payout of the cable. This is particularly simple and cost efficient to manufacture while ensuring cable is not inadvertently paid out from the reel.

In one embodiment of the invention there is provided a hand held cable reel comprising a central cable receiving core mounted between a pair of disc like end flanges, the cable reel further comprising means to retain the cable in position relative the cable reel, characterised in that said means to retain the cable in position relative the cable reel further comprises a gripping device having an elongate body portion secured at one end to the flange and its other end being dimensioned to receive a cable, the end dimension to receive a cable being movable from a loading position substantially intermediate the pair of flanges and a securing position substantially external the flanges, the cable reel further comprising a hole in the flange, the end of the gripping device dimensioned to receive a cable being movable through the hole in the flange to and from a loading position and a securing position.

By having such a cable reel the cable when wound up on the cable reel can be secured to the cable reel in a simple and efficient manner that will not affect the durability of the cable reel. The end of the cable may be taken from a position between the flanges to a position outside the flanges and secured tightly outside the flange. As the gripping device is movable in this way, it will not hinder the winding up of the cable onto the reel by being located intermediate the flanges when in a rest position. This is seen as a particularly useful embodiment of the invention as the gripping device may be passed through the hole in the flange, the cable passed around it and then the gripping device may be taken back through the hole in the flange thereby securely fastening the cable in position. This would prevent any further payout of the cable and is both simple and inexpensive to manufacture.

In another embodiment of the invention there is provided a hand held cable reel in which there are provided a plurality of holes in the flange and the end of the gripping device secured to the flange is rotatably mounted on the outermost surface of the flange so that the gripping device may be rotated about the flange and the end of the gripping device dimensioned to receive the cable may be passed through any one of the holes at any one time. This is seen as useful as the cable reel may accommodate a number of different sizes of lengths of cable. By having a number of holes in the flange the gripping device can always grip the cable adjacent an end thereof which would prevent having to have loose cable that is not tightly secured to the cable reel.

5 In a further embodiment of the present invention there is provided a hand held cable reel in which there are provided ridges protruding outwardly from the outermost surface of the flange adjacent the hole for through passage of the end of the gripping device dimensioned to receive a cable to prevent inadvertent dislodgement of the gripping device. By having ridges protruding outwardly from the outermost surface of the flange the gripping device will be protected and will not be inadvertently dislodged on impact. This will provide a more robust secure device.

10 In one embodiment of the invention there is provided a hand held cable reel in which the end of the gripping device dimensioned to receive the cable is flush with the innermost surface of the flange when the gripping device is not in use. By having the end of the gripping device dimensioned to receive the cable flush with the innermost surface of the flange the gripping device will not inhibit the winding up of cable around the cable reel when the gripping device is not in use.

15 In another embodiment of the invention there is provided a hand held cable reel in which there is provided an outwardly depending lip around the circumference of the flange having the gripping device mounted thereon.

20 In a further embodiment of the present invention there is provided a hand held cable reel in which the gripping device is constructed from a resiliently deformable material. This will enable the cable reel to have as few operating parts as possible. It is envisaged that the resiliently deformable material may be formed from a strip of metallic material or from a resiliently deformable plastic material.

25 In one embodiment of the invention there is provided a hand held cable reel of the type comprising a central cable receiving core mounted between a pair of disc like end flanges, a handle mounted on the outermost surface of one of the disc like end flanges radially offset from the central axis of the core, characterised in that there is provided a central bore extending substantially along the length of the central cable receiving core accessible through a hole in the other disc like end flange and there is further provided a rotatably mounted handle located at the bottom of the central bore. By having a central bore extending substantially along the length of the central cable receiving core and a handle rotatably mounted on the bottom of the central bore the two handles used by an operator to

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wind up the cable around the cable reel will be significantly closer together than with other known types of cable reel. In this way, the handles may be wound in substantially the same plane which will facilitate the winding up of cable about the cable reel. The cable reel will be less likely to oscillate from side to side when the cable is being wound about the reel and cable unwinding is greatly facilitated.

In another embodiment of the invention there is provided a hand held cable reel in which at least one of the handles further comprises a base portion rotatably mounted on the cable reel and a grip portion mounted on the base portion, the base portion and the grip portion being arranged to form a loop for reception of at least one finger of an operator therethrough. This is seen as a particularly useful handle for use with the cable reel that allows the cable reel to be gripped in a firm manner by an operator which will further reduce the tendency of the cable reel to oscillate from side to side.

In a further embodiment of the present invention there is provided a hand held cable reel in which the rotatably mounted handle located at the bottom of the central bore further comprises a base portion rotatably mounted on the bottom of the central bore and a grip portion mounted on the base portion arranged to form a loop for reception of the fingers of an operator therethrough.

In one embodiment of the invention there is provided a hand held cable reel in which the base portion of the handle located at the bottom of the central bore further comprises an outwardly projecting cylindrical lip substantially surrounding the base portion and extending orthogonally therefrom so that the hand of the operator may be placed on the handle with the lip substantially surrounding the hand of the operator to prevent injury to the hand of the operator on rotation of the handle. This will prevent the operators hand and in particular their knuckles from rubbing against the interior of the bore and becoming chaffed over time as their hand moves relative the interior of the bore.

In another embodiment of the invention there is provided a hand held cable reel in which the outwardly projecting lip further comprises at its outermost end a protective flange extending substantially orthogonal to the lip and which lies along in close proximity to portion of the external face of the disc like end flange. In this way the wrist of the operator

will also be protected from rubbing against the disc like end flange as the operators hands are used to rotate the cable reel. Their wrists will in fact rest against the protective flange which will not be rotating relative their wrist. In one embodiment it is envisaged that the protective flange may in fact be curved to accommodate the wrist of an operator.

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In a further embodiment of the present invention there is provided a hand held cable reel in which the protective flange is annular and surrounds the outwardly projecting cylindrical lip.

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In one embodiment of the invention there is provided a hand held cable reel in which the loop formed by the grip portion and the base portion is substantially elliptical in shape. By elliptical, what is meant is that the loop is a shape similar to that found on nail brushes. This leaves a very simple handle to grip and operate.

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In another embodiment of the invention there is provided a hand held cable reel in which the central bore extends along the entire length of the cable receiving core and the rotatably mounted handle located at the bottom of the bore is mounted on the innermost surface of the flange upon which there is the other handle mounted on it's outermost surface.

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According to the invention there is provided a hand held cable reel of the type comprising a cable receiving core mounted between a pair of disc like end flanges characterized in that the hand held cable reel further comprises a pair of disc like operating flanges substantially coplanar with and having a greater diameter than the disc like end flanges, the disc like end flanges and operating flanges being freely rotatable

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with respect to each other. By having a pair of operating flanges with a diameter greater than the end flanges the operating flanges rather than the end flanges will make contact with the ground and the cable reel will roll along the ground about these operating flanges. Due to the fact that the operating flanges and the end flanges are freely rotatable with respect to each other, when the cable is being fed out from the cable reel,

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the cable will not become taut as the cable is able to be fed out at a speed faster than if the end flanges had been in contact with the ground. The cable can therefore be paid out at the same speed as that dictated by the movement of the operating flanges along the ground. The cable will not be stretched or damaged in any way.

Furthermore, when it is time to wind the cable up about the cable reel once again the operator may simply manipulate the end flanges at their desired speed which will cause the cable to be wound up on the cable receiving core. Slack will not form in the cable as the rate at which the cable is wound around the core is no longer dictated by the rate at which the ground engaging flanges are rotated along the ground. The operator of the device will not have to repeatedly drag the entire cable reel along the ground in order to remove the slack from the cable and the cable may be wound around the cable receiving core in a more compact and organized manner.

In another embodiment of the invention there is provided a cable reel in which the operating flanges are mounted external the end flanges relative the cable receiving core. This will provide a simple construction of cable reel that is cost efficient and less difficult to manufacture. Furthermore, the cable reel will be simple to manipulate by the operator allowing the cable to be wound or unwound in a quick and efficient manner.

In a further embodiment of the invention there is provided a cable reel in which the cable receiving core is substantially hollow and the pair of operating flanges are connected together by way of a central elongate strut passing through the hollow cable receiving core and connected to each of the operating flanges at its ends. This is seen as a simple embodiment of cable reel that will be cost efficient and relatively simple to manufacture. The use of expensive bearings and the like are avoided by providing a cable reel having this construction.

In one embodiment of the invention there is provided a cable reel in which the central elongate strut is telescopic so that the pair of operating flanges may move towards and away from each other. By having a telescopic strut the operating flanges may be spaced apart when it is desired to roll the cable up on the cable reel thereby giving the operator sufficient room to manipulate the end flanges with their hands. Furthermore, by having the operating flanges spaced as far apart as possible the cable reel will be less inclined to diverge off course and will therefore require less human intervention when the cable is being paid out. The operating flanges may then be brought in close together when the cable reel is being stored to enable the cable reel to be stored in the most compact manner possible. Preferably, there will be provided a locking mechanism to hold the two operating flanges in position relative to each other. This will prevent the two operating

flanges from rotating at different speeds which would cause the cable reel to diverge off course when the cable was being paid out. This will also prevent the operating flanges from collapsing inwardly when the cable is being wound about the cable reel which could cause injury to the operator.

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In another embodiment of the invention there is provided a cable reel in which the locking mechanism is a bayonet fitting. This is seen as a particularly simple and cost effective fitting to use as the locking mechanism.

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In a further embodiment of the invention there is provided a cable reel in which there is further provided an additional locking mechanism to releasably secure the operating flanges and the end flanges in position relative to each other. This is seen as a useful feature as it may in certain circumstances be preferable to have the two pairs of flanges connected together. One example of such a situation would be to prevent inadvertent unraveling of the cable from the cable reel when not in use. In order to unravel, the entire cable reel would have to be moved thereby preventing inadvertent unraveling.

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Detailed Description of the Invention

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The invention will be more clearly understood from the following description of some embodiments thereof given by way of example only in which:-

Fig. 1 is a front view of a hand-held cable reel according to the invention;

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Fig 2. is a perspective view of a hand-held cable reel similar to that shown in Fig 1 with an alternative construction of handle mounted thereon;

Fig. 3 is a front view of an alternative construction of cable reel according to the invention;

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Fig. 4 is a front view of the cable reel shown in Fig. 3 with it's handles in a storage configuration;

Fig. 5 is a front view of an alternative construction of cable reel according to the invention;

Fig. 6 is a front view of the cable reel shown in Fig. 5 with it's handles in a storage configuration;

Fig. 7 is an end view of the cable reel shown in Figs. 5 and 6;

Fig. 8 is a perspective view of an alternative construction of cable reel according to the invention;

Fig. 9 is an enlarged view of a bollard for securing a loop of cable used with the hand-held cable reel of the present invention;

Fig. 10 is an enlarged exploded view of one type of handle of the cable reel according to the invention;

Fig. 11 is a side view of an alternative construction of cable reel according to the invention;

Fig. 12 is an alternative construction of handle for use with the cable reel according to the invention;

Fig. 13 is a side sectional view of an alternative construction of handle for use with the cable reel according to the invention;

Fig. 14 is an alternative construction of bollard for use with the cable reel according to the invention;

Fig. 15 is an alternative construction of handle for use with the cable reel according to the invention;

Fig. 16 is a perspective view of a hand held cable reel according to the invention;

Fig. 17 is a side view of the hand held cable reel of Fig. 16;

Fig. 18 is an end view of the hand held cable reel shown in Fig. 17 along the lines A - A;

Fig. 19 is an end view of the hand held cable reel shown in Fig. 17 along the lines A-A with the gripping portion in a loading position;

- 5 Fig. 20 is an end view of the hand held cable reel shown in Fig. 17 along the lines A-A with the gripping portion in a securing position with the cable secured therein;

Fig. 21 is a side view of an alternative construction of gripping portion for use with the hand held cable reel;

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Fig. 22 is a partially cut away end view of an alternative construction of hand held cable reel according to the invention;

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Fig. 23 is a partially cut away end view of a further alternative construction of hand held cable reel according to the invention;

Fig. 24 is a perspective view of an alternative construction of hand held cable reel according to the invention;

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Fig. 25 is a side cross-sectional view of an alternative construction of means to retain the cable in position for use with the cable reel according to the invention;

Fig. 26 is a similar view to that shown in Fig. 25 with a length of cable being introduced into the gripping device;

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Fig. 27 is a view similar to that shown in Figs. 25 and 26 with the length of cable retained by the gripping device;

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Fig. 28 is an alternative construction of gripping device for use with the cable reel according to the invention;

Fig. 29 is an end view of an alternative construction of cable reel according to the invention;

Fig. 30 is a partial perspective view of a cable reel having an alternative construction of protective shield;

Fig. 31 is a cross-sectional view along the lines B-B of Fig. 30;

Fig. 32 is a perspective view of an alternative construction of cable reel according to the invention;

Fig. 33 is a cross-sectional view along the lines C-C of Fig. 32;

Fig 34 is a perspective view of a cable reel according to the invention;

Fig 35 is a cross-sectional view along the lines A-A of the cable reel of Fig 34;

Fig 36 is a cross-sectional view of an alternative embodiment of cable reel according to the invention;

Fig 37 is a cross-sectional view of a locking mechanism used with the cable reel of Fig 36;

Fig 38 is a cross-sectional view of another still alternative embodiment of cable reel according to the invention;

Fig 39 is a cross-sectional view of an alternative embodiment of cable reel similar to that shown in Fig 36 with a locking mechanism provided;

Fig 40 is a cross-sectional view of an alternative embodiment of locking mechanism for use with the cable reel shown in Fig 39;

Fig 41 is a cross-sectional view of another still alternative embodiment of locking mechanism for use with the cable reel shown in Fig 39;

Fig 42 is an exploded view of an alternative embodiment of locking mechanism according to the invention;

Figs 43(a) and 43(b) are cross-sectional views of the locking mechanism shown in Fig 42;

5 Figs 44a to 44d inclusive are alternative embodiments of handle for use with the present invention;

Figure 45 of the drawings there is shown an alternative construction of handle for a cable reel according to the invention; and

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Figure 46 shows an alternative construction of handle.

Referring to the drawings and initially to Figs. 1 thereof there is shown a hand-held cable reel, indicated generally by the reference numeral 1, comprising a central cable receiving
15 core 3 mounted between a pair of disc like end flanges 5, 7, each of the disc like end flange having a handle 9, 11 mounted on the outermost surface of the flange. Each of the handles 9, 11 is radially offset from the central axis of the core and circumferentially offset relative to the other handle. Each handle 9, 11 comprises a substantially c-shaped grip portion 12 having a body portion 13 bridging a pair of inwardly depending arms 15, 17, the
20 free ends of each of the arms face the flange upon which they are mounted. The c-shaped grip portion is rotatably mounted on the flange by way of a connector bar 19.

In use, an operator grasps each grip portion 12 tightly by wrapping his fingers around the grip portion with the inside of his wrist facing the outermost surface of the flange. The
25 operator then pays out or winds up cable by rotating the cable reel in the known manner.

Referring to Fig 2 of the drawings there is shown a cable reel similar to that shown in Figure 1 with an alternative construction of handle. The handle 9 comprises a base portion 21 rotatably mounted on the flange 5 and a grip portion 23 connected to the base portion 21.
30 The base portion 21 and the grip portion 23 are arranged to form a loop for reception of at least one finger of an operator therethrough.

Referring now to Figs. 3 and 4 of the drawings there is shown an alternative construction of hand-held cable reel, again indicated by the reference numeral 1. In this embodiment parts

similar to those described with reference to the previous drawings are identified by the same reference numerals. In this embodiment each handle 9,11 comprises a shaft 25 cranked intermediate it's ends to form an L-shaped handle. The proximal end 27 of each of the shafts is connected to its respective flange 5, 7 by way of hinge 29. The distal portion of the shaft forms a hand grip 31 having a sleeve 33 rotatably mounted thereon for manipulation by an operator. There is additionally provided means to releasably secure each handle in position relative it's respective flange (not shown).

In use, the handles are secured in an operating position as shown in Fig. 3. The operator grasps the rotatable sleeve firmly and rotates the cable reel in the known manner. Once the cable reel has served it's purpose and the cable has been wound back upon the core, the means to releasably secure the handle in position is released, the handle is pivoted about hinge 29 through approximately 180° until it reaches the storage position shown in Fig. 4. In this position the grip portion 31 of the shaft extends along the length of the core from one flange to the other. In this way, the cable reel will be relatively compact and can be stored using the minimum of space. Furthermore, inadvertent unwinding of the cable from the core will be prevented. The means to releasably secure the handle in position (not shown) may be operated once again to maintain the handles in the storage configuration.

Referring now to Figs. 5 to 7 inclusive of the drawings there is shown an alternative construction of hand-held cable reel, again indicated generally by the reference numeral 1. In this embodiment parts similar to those described with reference to the previous drawings are identified by the same reference numerals. In this embodiment each flange 5, 7 is cam shaped having a protrusion extending outwardly from the surface of the flange. A handle securing hole 35 is provided on the protrusion for reception of the end of the grip portion 31. In use, when the cable reel is to be stowed away the means to secure the handle in position (not shown) is released and the handles are pivoted through 180° to the position shown in Fig. 6. The two flanges are constructed from a resilient plastics material and are forced outwards until the end of the grip portions are inserted through the handle receiving holes 35. At that point the resilient flange springs back to it's normal position thereby securing the handles in a storage configuration. In order to release the handles the resilient flange is bent outwardly and at the same time the handle is pivoted about the hinge 29 until the end of the grip portion is free of the handle receiving hole.

Referring now to Fig. 8 of the drawings there is shown an alternative construction of hand-held cable reel, again indicated generally by the reference numeral 1. In this embodiment, parts similar to those described with reference to the previous drawings are identified by the same reference numerals. In this embodiment, a length of insulating cord 37 is provided and is stored in cavity 39 in the end flange 5. The electrically insulating cord 37 may be used to suspend the cable reel from an object (not shown) which it is desirable to keep the cable reel electrically isolated from. Such a cord 37 may terminate in a metal hook (not shown).

Referring now to Fig. 9 of the drawings there is shown an enlarged view of one embodiment of a bollard 41 for securing a length of cable in position on the cable reel. A loop of cable 43 is lead out through a hole 45 in the end flange 5 and is fed into the corrugated groove 47 extending across the width of the bollard 41. The cable is then led back through hole 45. In this way, the bollard will secure the cable in a simple and efficient manner.

Referring now to Fig. 10 of the drawings there is shown an enlarged exploded view of the handle of the hand-held cable reel shown in Fig 2. The handle comprises a base portion 21 and a grip portion 23. The grip portion 23 further comprises an elongate connector bar 49 and a C-shaped grip bar connected at its free ends to the connector bar. The base portion 21 further comprises a pair of connector bar receivers 53 for engagement with the connector bar. The connector bar has a sleeved, spring loaded end 55 and at its other end 57 is provided with a spigot 59 for cooperation with one of a pair of spigot receiving grooves 61a, 61b, in the connector bar receiver of the base portion. In order to connect the grip portion and the base portion together the sleeved spring loaded end 55 of the connector bar is inserted into a hole (not shown) of one of the connector bar receivers and force is applied against the spring action thereby temporarily reducing the overall length of the connector bar. The other end 57 of the connector bar is placed adjacent to a hole 63 of the other connector bar receiver 53. The spigot 59 of the connector bar is aligned with the spigot receiving groove 61b. Once the spigot 59 and spigot receiving groove 61b have been aligned the connector bar is released and the spring loaded end 55 acting under the spring force pushes the other end 57 of the connector bar into the hole 63 of the connector bar receiver 53. The grip portion and the base portion are then held in a fixed relationship.

with respect to each other by virtue of the spigot 59 which is firmly housed in spigot receiving groove 61b.

5 In order to pivot the grip portion through approximately 90° so that the grip portion lies flat along the base portion, the grip portion is moved against the spring loaded end 55 of the connector bar until the spigot 59 is released from the spigot receiving groove 61b. The grip portion and hence connector bar and spigot are rotated through 90° until spigot 59 and spigot receiving groove 61a are in alignment at which point the grip portion is released. The spring loaded end will then force the spigot 59 and spigot receiving groove 61a into
10 engagement which will retain the grip portion in a fixed configuration with respect to the base portion.

Referring now to Fig. 11 of the drawings there is shown an alternative construction of cable reel according to the invention. A substantially circular hole 65 is cut out of the centre of the
15 flange 5. At least two grooves 67a, 67b, are cut into the flange from the inner circle thereby providing a tooth 69 for securing a piece of cable. Cable may be lead through another hole on the flange adjacent the outer periphery rim of the flange around the tooth portion and back through the hole in order to secure the cable in position.

20 Referring to Fig. 12 of the drawings there is shown an alternative construction of handle for use with the cable reel of the present invention. The handle comprises a C-shaped frame having bottom wall 71 and side walls 73 and 75. The side walls 73, 75 are connected together by a cross bar 77 at one end thereof. A pivot bar 79 extends from crossbar 77 downwards through bottom wall 71 for connection to a flange of the cable reel (not shown).
25 The handles therefore fully rotate about the flange. As an alternative to having the handle pivot about pivot bar 79 an additional pivot pin (not shown) could be provided in a substantially central position on the bottom wall 71.

In use the operator inserts two fingers into the handle, one either side of the pivot pin and
30 winds the cable in or out by rotating the cable reel in the known manner.

Referring now to Fig. 13 of the drawings there is shown a side sectional view of an alternative construction of handle for use with the cable reel according to the invention.

Instead of having a sleeve mounted on a hand grip portion as described previously, there is provided a hand grip portion 81 rotatably mounted on a shaft portion 83.

5 Referring to Fig. 14 there is shown an alternative construction of bollard for use with the present invention. A loop of cable 85 is passed through hole 87 in the flange 5 and led around at least one, preferably one although possibly two, flap shaped bollards 89 on the outside of the reel flange. Each flap shaped bollard 89 projects laterally from the flange surface and may be recurved to enhance its effectiveness. The flap shape bollards may be recurved either towards the centre of the flange or towards the outer peripheral rim of
10 the flange.

Referring to Fig. 15 there is shown a perspective view of an alternative construction of handle for use with the present invention. A C-shaped grip bar 91 flattened parallel to the reel flange (not shown) and permanently held in its working position while rotatably fixed to
15 the flange. A base plate 93 is provided although it will be understood that this is not entirely necessary. The grip bar may be suitably contoured to accommodate the fingers and thumb of either hand. The grip bar is further provided with a pair of frusto conical projections 95, 97 to facilitate rapid unwinding of the tape or cable from the reel while the projections are held between the thumb and middle finger of the right or left hand. It is understood that
20 Instead of projections 95, 97, a pair of depressions may be provided as the functional equivalent. Neither the projections or depressions are essential.

It will be understood from the foregoing specification and drawings that a plurality of circumferentially spaced holes adjacent to the outer periphery rim of each flange may be
25 provided as well as a plurality of upstanding bollards (not shown) on the outermost face of each end flange in order to secure the cable in position once a sufficient amount of cable has been paid out by the operator of the hand-held cable reel. The cable is simple led through one of these holes, looped around a bollard and led back through the same hole which will effectively secure the cable from further payout.

30 It will be further understood that in some of the embodiments shown the connector bar 49 was held in position by way of a splgot 59 on the connector bar and splgot receiving holes 61a, 61b on the connector bar receivers 53. It is envisaged that several different ways of securing the connector bar in position could be used. For example a simple spring lock,

twist lock or other device such as an over centre spring could be used to releasably secure the grip portion of the handle in an operating position in which the grip portion protrudes laterally from the base portion or a storage configuration in which the handle rests along the base portion. It is further envisaged that different locking mechanisms for the handle portion
5 that is allowed to pivot relative the base portion other than those described may be used that would fall within the scope of the invention. Essentially what is required is any lock that will firmly secure the handle in either an operating position or a storage position when desired. It is envisaged that an electrical plug socket may be provided on at least one outer face of the reel flange for reception of an electrical plug. In this way the cable reel could be
10 used as an electrical cable extension.

In certain embodiments the handles have been described as being hingedly mounted onto the flange. It will be understood that what is essential for the embodiments in which the handle is pivotable is that the handle is let pivot through either approximately 90° or
15 approximately 180° as desired. The pivot joint may be a hinge or other similar pivot joint that will allow this movement. These other connections are to be considered as included within the scope of the invention.

Referring now to Figures. 16 and 17, where like parts have been given the same reference
20 numerals as before, there is shown a hand held cable reel 1, comprising a central cable receiving core 3 mounted between a pair of end flanges 5, 7 having means to secure a length of cable 101 relative the cable reel. The means to secure a length of cable further comprising a gripping device 103 secured at one end 105 to the flange 5 and its other end
25 107 being dimensioned to receive a cable. The end 107 dimensioned to receive a cable is movable from a loading position substantially intermediate the pair of flanges and a securing position substantially external the flanges. The end 105 is rotatably mounted on the flange and there are provided a plurality of holes 109 in the surface of the flange. Ridges 111 are located adjacent each of the holes. There are further provided handles 113
30 for manipulation by the user of the hand held cable reel.

In use, when it is desired to store the cable the user grasps the handles 113 and winds the cable up around the cable receiving core until the cable is fully wound around the cable receiving core. The gripping device is rotated by the user to the hole 109 in the flange nearest the end of the cable. The end 107 of the gripping device is pushed inwardly

through hole 109 and the cable is placed in the end dimensioned to receive a cable. The end 107 is released and it acts under resilient spring pressure to return to its original position thereby drawing the cable towards the hole in the flange and against the inner surface of the flange and securing the cable in position. The cable will be held in this position until the resiliently deformable gripping device end 107 is pushed inwardly again and the cable removed from that end.

Referring to Figs. 18 to 20 inclusive of the drawings there is shown a number of end views taken along the lines A – A of Fig. 17. In Fig. 18, the gripping device 103 is in a rest position. When the cable is ready to be secured in position the operator pushes the end 107 of the gripping device 103 through the hole 109. A cable 115 is then introduced to end 107 of the gripping device (Fig. 19) and the pressure on the end of the gripping device is released. The gripping device springs back under the returning force (Fig. 20) thereby securing the cable in position. In order to release the cable from the gripping device the end 107 will have to be pushed through the hole 109 and the cable removed from the end 107.

Referring to Fig. 21 of the drawings there is shown an alternative construction of gripping device for use with the cable reel of the present invention. The gripping device is substantially flat with the exception of a returning end 117 suitable for receiving the cable. The hole 119 in the flange 5 is larger to allow greater deflection of the gripping device 117 through the hole 119 to allow gripping of a length of cable.

Referring to Fig. 22 of the drawings there is shown an alternative construction of cable reel according to the invention where like parts have been given the same reference numerals as before. The cable reel 1, comprises a central cable receiving core 3 mounted between a pair of disc shaped end flanges 5, 7. A handle 9 is rotatably mounted on one flange 5 and is radially offset from the central axis of the central cable receiving core. The handle comprises a base portion 21 rotatably mounted on the flange and a grip portion 23 connected to the base portion. The grip portion 23 and the base portion 21 are dimensioned to form a loop for reception of the fingers of an operators hand. The central cable receiving core 3 further comprises a central bore 121 extending substantially along its length. A handle 123 is rotatably mounted to the bottom of the bore 121. The handle 123

is therefore mounted on the innermost surface of the flange 5 that has the other handle 9 mounted on its outermost surface.

Referring to Fig. 23, where parts similar to those shown in Fig. 22 have been given the same reference numerals as before, the cable reel which is used as an electrical cable extension is further provided with a plug socket 125 for reception of a plug 127 of an electrical appliance (not shown). The handle 123 rotatably mounted on the bottom of the bore 121 is not therefore mounted on the innermost surface of the flange 9 but is as close as possible thereto.

Referring now to Fig. 24 of the drawings there is shown a perspective view of an alternative construction of cable reel according to the invention where like parts have been given the same reference numerals as before. The cable reel 1 has a pair of sockets 129, 131 mounted on one end flange 7 thereof.

Referring now to Figs. 25 to 27 inclusive there is shown a side cross-sectional view of an alternative construction of means to retain the cable in position according to the invention, where like parts have been given the same reference numerals as before. The gripping device 103 is secured at one end 105 to the flange by way of rivet 133. The other end 107 dimensioned to receive a cable is located adjacent protective shield 135 which prevents inadvertent release of the gripping device while at the same time assisting in the securing of the cable in the end 107 of the gripping device.

In use, the end 107 is bent inwardly and the free end of a length of cable 137 is introduced into the end 107 of the gripping device. The end 107 is released and returns upwardly under its resilient force to the position shown in Fig. 27 thereby trapping the cable in position relative the cable reel.

Referring to Fig. 28 of the drawings there is shown an alternative construction of gripping device for use with the cable reel of the present invention where like parts have been given the same reference numeral as before. The gripping device 103 is bent upwardly intermediate its ends 105, 107 so that the end dimensioned to receive a cable 107 touches the protective shield 135. Of course it will be understood that the end 107 need not necessarily rest against the protective shield but may be held adjacent the shield.

Referring to Fig. 29 of the drawings there is shown an end view of an alternative construction of cable reel according to the invention where like parts have been given the same reference numerals as before. The gripping device 103 is rotatably mounted on the end flange 5 about point 141. The gripping device 103 may be rotated about point 141 until the end dimensioned to receive the length of cable (not shown) may be passed through one of the holes 109 in the flange 5 and further rotated until the end (not shown) is located underneath the protective shield 135.

Referring now to Figs. 30 and 31 of the drawings there is shown a partial perspective view of an end flange 5 with an alternative construction of protective shield 143 for use with the cable reel according to the invention. The protective shield 143 has an inverted U-shaped cross-section and has a downwardly depending lip 145 to prevent inadvertent dislodgement of the gripping device (not shown) sideways from the hole 109 in the flange 5 as well as protecting the gripping device being inadvertently depressed thereby releasing the cable (not shown) from the gripping device. The downwardly depending lip 145 leaves a sufficient gap for movement of a gripping device to and from a position underneath the protective shield.

Finally, referring now to Figs. 32 and 33 of the drawings there is shown another alternative construction of cable reel according to the invention with an alternative means to secure a length of cable. The means to secure a length of cable further comprises a casing 147 having a cut out portion 149 through which a gripping device may be accessed by an operator. In use, the gripping device is depressed by an operator by passing their finger through the cut out portion 149 in the casing 147. The end 107 of the gripping device 103 is arranged to form a returning hook shape with an upwardly depending lip 151. The operation of the gripping device will be self explanatory from the foregoing..

It is envisaged that the gripping devices described can be constructed from a metallic material or a plastics material or other suitable material. Preferably the gripping device is constructed from a resiliently deformable material. Alternatively, a suitable hinge joint and resilient spring biasing means could be provided to urge the gripping device into a storage position.

In the embodiments shown there are provided holes in the end flange however it will be understood that the important aspect is that the gripping device can move from a position intermediate the flanges to a position external the flanges in order to lock the cable in position. It is envisaged that a suitable gripping device could be placed on the end of the
5 flange and could pivot to and from a loading position intermediate the flanges where a cable could be attached thereto and a securing position external the flange where the portion of the cable is trapped outside the flanges.

In the embodiments shown two or three holes are provided on the flange for through
10 passage of the end of the gripping device. It will be understood that a single hole or any other number could be provided on the cable reel. Furthermore, the handles shown in the specification are loop type handles that may be easily gripped by an operator. It will be understood that different types of handle could be used instead of these types of handles. Any handle that will allow adequate grip of the cable reel to be achieved by an operator
15 would suffice. The handles could be detachably mounted onto the outer surface of the flange or they could be pivotably mounted so that they can pivot from a position protruding outwardly from the flange to a position lying along the surface of the flange for ease of storage. An alternative spring mechanism may be found in other embodiments.

20 Referring now to Fig 34 of the drawings, where like parts have been given the same reference numerals, there is shown a cable reel 1, having a cable receiving core 3 mounted between a pair of disc like end flanges 5, 7 and a pair of operating flanges 161, 163 having a greater diameter than the end flanges and being freely rotatable with respect to the end flanges. The operating flanges are located external the end flanges
25 relative the cable receiving core. A cable 165 is wound around the cable receiving core 3.

In use, the cable reel is placed on the ground so that the outer rim 167 of each of the operating flanges 161, 163 will rest on the ground and both the end flanges 5, 7 and the
30 cable will be held spaced apart from the ground. In order to pay out cable from the cable reel the operator of the cable reel affixes the free end of the cable to a post or the like and then rotates the cable reel in the known manner until a sufficient amount of cable is paid out. The operating flanges will roll along the ground however the end flanges and hence the cable receiving core will not, the cable receiving core rotates at a speed

sufficiently fast to pay out sufficient cable and prevent the cable becoming so tensioned that the cable becomes damaged. In order to wind the cable back up on the cable reel, the operator grasps the end flanges and rotates the cable receiving core via the end flanges. The cable will be wound gradually onto the cable receiving core without the operator having to manhandle the cable reel and drag the cable reel along the ground to maintain sufficient tension in the cable as it is being wound about the cable receiving core.

Referring to Fig 35 of the drawings there is shown a cut away view of the cable reel of Fig 34 without the cable thereon showing the interior of the cable receiving core 3. The cable receiving core 3 is substantially hollow and the pair of operating flanges 161, 163 are connected together by way of a central elongate strut 169 passing through the hollow cable receiving core and connected to each of the operating flanges at it's ends. The central elongate strut is freely rotatable in the hollow cable receiving core.

Referring to Fig 36 of the drawings there is shown an alternative construction of cable reel in which like parts have been given the same reference numerals as before. The central elongate strut further comprises a two-part telescopic strut having a pair of strut sections 171a, 171b. Each strut section 171a, 171b has an operating flange connected thereto at one end and the other end 173a of strut section 171a fits inside the other end 173b of strut section 171b. The end 171a is slidable back and forth within the end 171b and a locking mechanism (not shown) is provided to releasably secure the operating flanges in position relative to each other.

Referring to Fig 37 of the drawings there is shown a cross sectional view of one type of locking mechanism that may be used to releasably secure the two operating flanges in position relative to each other. The locking mechanism comprises a bayonet fitting, indicated generally by the reference numeral 175 having a pair of jaws 177a, 177b that may be tightened and brought closer together or loosened and further separated by twisting adjustment member 179. The adjustment member 179 has a screw thread 181 for cooperation with a corresponding screw thread 183 on the pair of jaws 177a, 177b.

Referring to Fig 38 of the drawings there is shown another still alternative embodiment of cable reel according to the invention where like parts have been given the same

reference numeral as before. The cable reel 1 has a handle 9 mounted on the outside face of one end flange radially offset from the central axis of the core. The cable receiving core has a central bore 121 extending substantially along its length and there is provided an inner handle 123 rotatably mounted at the bottom central bore. The inner
5 handle 123 comprises a base portion 191 rotatably mounted on the cable reel and a handle portion 193 secured to the base portion, the base portion further comprising an outwardly projecting lip 195 substantially surrounding the base portion 191 and extending orthogonally therefrom so that the hand (not shown) of an operator may be placed on the handle portion 193 with the lip 195 substantially surrounding the hand of
10 the operator to prevent injury of the operator's hand on rotation of the handle. The outwardly projecting lip 195 further comprises at its outermost end an annular flange 197 projecting outwardly and substantially orthogonal to the lip 195 and which lies along the external face of the flange. Ball bearings 199 are provided intermediate the annular flange and the external face of the flange to facilitate rotation of the handle. Further ball
15 bearings 201 are provided intermediate the base portion and the bottom of the cable receiving core. The base portion 191 is rotatably mounted on the bottom of the central bore by snap fitting the base portion in position. A boss 203 located on the bottom of the cable receiving core is snap fitted through a hole (not shown) in the base portion. There are further provided ball bearings 205 located intermediate the handle mounted on the
20 end flange and the end flange to promote rotation. One advantage of having an inner handle is that the cable reel may be laid flat on its flange.

It is envisaged that various different methods of attaching the inner handle to the cable reel could be employed and it will be understood that only one possible way has been
25 shown here. It is further envisaged that the two part handle could be snap fitted together also for ease of construction using any suitably dimensioned base and handle portions. Furthermore two sets of ball bearings between the handle and the cable reel have been shown. It is understood that both sets of ball bearings need not be provided but a single set or indeed other means such as a lubricant would suffice to ensure proper operation
30 of the device. Indeed the ball bearing could be located intermediate the outwardly projecting lip 195 and the interior wall of the central bore 121.

Referring to Figure 39 of the drawings there is shown another alternative embodiment of cable reel according to the invention where like parts have been given the same

reference numerals as before. In this instance, both of the strut sections 171a, 171b are substantially hollow with the end of strut section 173a passing through the open end of strut section 173b. Pins 211a, 211b mounted on the end 173a of strut section 171a pass through a pair of complimentary slots 213a, 213b respectively formed in the strut section 171b. The dimensions of the slots 213a, 213b act to limit the movement of the operating flanges relative to each other. A locking mechanism 215 comprising an elongate locking arm 217 cranked intermediate its ends is pivotally connected adjacent its crank point to the interior of the strut section, one end of the locking arm forming a locking pin 219 and the other end 221 being accessible for manipulation by an operator of the cable reel. A slot 223 is provided on the strut section 171a to enable through passage of the locking pin 219. Similarly, a slot 225 is provided on strut section 171b to enable through passage of the locking pin 219 through strut section 171b. Biasing means are provided by way of a spring (not shown) to urge the locking pin 219 in the direction of the slots 223, 225. Finally, the cable receiving core has an annular groove 227 formed therein around its circumference capable of receiving the locking pin.

In use, when the operating flanges 161, 163 are held spaced apart from the end flanges to allow the hands of the operator to grip the end flanges and rotate the cable receiving core, the locking pin 219 passes through the slot 223 in the strut section 171a and bears against the end 173b of the strut section 171b thereby preventing movement of the operating flanges inwardly towards each other. Further outwardly movement of the operating flanges thereby further separating the two operating flanges is prevented by the pins 211a, 211b in grooves 213a, 213b. When it is desired to store the cable reel the operator pushes the end 229 of the locking arm 217 inwardly towards the flange until the locking pin 219 is free of the slot 223 and no longer bears against the end 173b of the strut section 171b. In this position the operating flanges will be able to move inwardly relative each other. The operating flanges are then gradually brought together and the end 229 of locking arm 217 may be released. Once the operating flanges are in a fully stored position the slots 223 and 225 and the annular groove 227 will fall into alignment and the locking pin 219, under action of the biasing spring, will pass through the slots 223, 225 and rest in groove 227. In this way, the operating flanges will be held in a fixed configuration with respect to each other while the cable receiving core is permitted to rotate freely. In order to pull the operating flanges apart into an operating configuration once again the end 229 of the locking arm 217 is pushed inwardly in order to release the

locking pin 219 from the slots 223, 225 and annular groove 227 and the operating flanges are pulled apart until pins 211a, 211b abut against the ends of slots 213a, 213b. The end 229 of the locking arm 217 is released once again and locking pin 219 passes through slot 223 in the strut section 171a and bears against the end 173b of the strut section 171b thereby preventing movement of the operating flanges inwardly towards each other.

It can be seen that the slots 213a, 213b are so dimensioned that the pins 211a, 211b are not permitted to rub against the cable receiving core. This helps to avoid excessive friction and does not inhibit the rotation of the cable receiving core. Furthermore, it will be understood that it is not necessary to provide a pair of pins 211a, 211b and a pair of slots 213a, 213b. In fact, a single pin and slot pair would suffice. It is envisaged that the end and the operating flanges may be provided with a lateral outwardly depending flanged rim that extends from adjacent the circumference of the flanges.

Referring to Fig 40, there is shown a cross-sectional view an alternative construction of locking mechanism for use with the cable reel according to the invention where like parts have been given the same reference numerals as before. For reasons of simplicity, only a portion of the strut section 171a of the cable reel has been shown but it will be understood that the remaining parts of the cable reel as shown in Fig 39 would also be provided. The locking mechanism comprises a securing pin 241 moveable through the aperture 223 in the strut section 171a. The securing pin 241 is actuable by way of an elongate locking lever 243 whose end 245 is bent substantially orthogonal to the main axis of the locking lever 243, the securing pin 241 is rotatably connected to end 245 of the locking lever and the other end 247 of the locking lever being accessible for manipulation by a user of the cable reel. A spring 249 is provided to urge the securing pin into a locking configuration in which the securing pin 241 passes through aperture 223.

The operation of the locking mechanism will now be described but it will be understood that the securing pin 241 of the locking mechanism operates in substantially the same way as the locking pin 219 of the previous embodiment and may be located in the slot 225 and annular groove 227 in a similar manner in order to secure the operating flanges in a fixed relationship with respect to each other. In order to retract the securing pin

within the strut section 171a, the end 247 of the locking lever is grasped by a user and then rotated to the position shown in the diagram. The entire locking lever will rotate and this causes end 245 connected to the securing pin to move away from the slot 223 thereby retracting the securing pin back through the slot. The operating flanges (not shown) may then be moved relative to each other with the securing pin 241 in a retracted position. Once the flanges are in the desired configuration the end 247 of the locking lever 243 is released and the spring 249 will rotate the locking lever until the locking lever is in a locking configuration once again. The locking lever including the end 245 rotate which causes the securing pin 241 to move outwardly relative the strut section 171a into the position shown in dotted lines. The operating flanges will then once again be held in a locked relationship with respect to each other in the manner previously described.

Referring to Fig 41 of the drawings there is shown a cross-sectional view of an alternative construction of locking mechanism according to the invention where like parts have been given the same reference numerals as before. The operation of the locking mechanism will now be described however it will be understood once again that for reasons of simplicity, only a portion of the strut section 171a has been shown but it will be understood that the remaining parts of the cable reel as shown in Fig 39 would also be provided. The locking mechanism further comprises a substantially horseshoe-shaped expandable portion 261, the free ends of which terminate in outwardly depending spigots 263a, 263b, and an elongate wedge-shaped portion 265 housed inside the strut section 171a. The wedge-shaped portion 265 has a threaded portion 267 for engagement with a corresponding threaded portion 269 of the strut section 171a and a hand-grip 271 for manipulation by an operator of the device.

In use, in order to lock the operating flanges in a fixed relationship with respect to each other, the slot 225, annular groove 227 and the slot 227 are placed in alignment by collapsing the operating flanges towards each other in the manner previously described.

The wedge-shaped portion 265 is then gripped by the hand-grip 271 and rotated thereby causing the wedge-shaped portion to advance inside the strut section 171a towards the expandable portion 261. Once the wedge-shaped portion 265 comes into contact with the horseshoe-shaped expandable portion 261 the outwardly depending spigots 263a, 263b of the horseshoe-shaped expandable portion are urged outwardly. On further

rotation of the hand-grip 271, the outwardly depending spigots are pushed outwardly through slot 223 and are allowed to pass through slot 225 and enter groove 227. In order to expand the operating flanges outwardly into a working configuration, the hand-grip 271 is rotated in the opposite direction to withdraw the wedge-shaped portion 265 from
5 between the arms of the horseshoe-shaped expandable portion 261 thereby allowing the arms of the horseshoe shaped expandable portion to contract and retreat the outwardly depending spigots 263a, 263b back from the groove 227 through the slots 225 and 223. The two operating flanges may then be moved relative each other to a fully expanded configuration at which time the hand-grip will be rotated once more to
10 separate the arms of the horseshoe-shaped expandable portion and force the outwardly depending spigots through the slot 223 whereafter they will prevent collapsing of the operating flanges in the manner previously described.

Referring to Figs 42, 43(a) and 43(b) of the drawings there is shown an alternative
15 construction of locking mechanism for use with the cable reel according to the present invention where like parts have been given the same reference numerals as before. The operation of the locking mechanism will now be described however it will be understood once again that for reasons of simplicity, only a portion of the strut section 171a has been shown but it will be understood that the remaining parts of the cable reel as shown
20 in Fig 39 would also be provided. The locking mechanism comprises a pair of elongate locking members 281, 283 slidably arranged with respect to each other. One of the sliding locking members 281 has a spigot 285 located on one side thereof upon which there is rotatably mounted a cam 287. The other of the sliding members 283 has an inclined face for bearing against the cam 287 when the locking members 281, 283 are
25 moved relative to each other. The locking members, cam and spigot are housed within the strut section 171a which is closed at one end by a disc 289. The slidable locking member 281, upon which the cam 287 is located, has a tapered end 291 which protrudes through an aperture in the disc 289 at the end of the strut section 171a. A spring 293 is mounted on the tapered end inside the strut section adjacent the disc and
30 acts upon the slidable locking member 281 and disc 289 to urge the slidable locking member inwardly into the strut section 171a towards the other locking member 283. A cam handle 295 is pivotally mounted adjacent the end of the tapered end 291 of the locking member 281 external the strut section 171a, operation of which will cause the slidable locking member to move relative to the other locking member.

In use, the cam handle is pivoted by the operator and acts against the disc 289 which causes the slidable locking member 281 to move relative the other locking member 283. Movement of the cam handle from the position shown in Fig 43 (b) to the position shown in Fig 43(a) will cause the locking member 281 to move towards the locking member 283. The cam 287 comes into contact with inclined surface and will rotate clockwise until at least portion of the cam member protrudes outwardly from the slot 223 in the strut section 171a. This portion of the cam will be inserted through the slot 225 and in turn will be housed in the annular groove 227 when the operating flanges are in a stored configuration and when the operating flanges are in a working configuration the portion of the cam protruding through the slot 223 will act against the end 173b of the strut section 171b in the manner previously described. This will be understood from the previous description of the operation of the cable reel and will not require further explanation to be understood by the person skilled in the art.

Referring to Figures 44a to 44d inclusive there are shown alternative embodiments of handle for use with the present invention. Figures 44a and 44b show a substantially elliptical shaped handle having a grip member 301 formed integrally therewith. The grip member 301 further comprises a substantially v-shaped member 303 having a pair of legs 305, 307, one of which is connected at its free end to the handle. The legs form an acute angle for reception of a wire (not shown). A pivot pin 309 mounts the handle to the flange. Referring specifically to Figure 44a, the pivot pin is substantially central with respect to the handle portion whereas in Figure 44b the pivot pin is located towards one end of the handle which will facilitate rotation of the handle.

Referring specifically to Figures 44c and 44d, there are shown a pair of handles similar to those seen in Figures 44a and 44b having an alternative connection to the handle portion. A rivet 311 connects the handle to the flange 5. In figure 44c the rivet is located centrally on the handle and on figure 44d the rivet is located towards one end of the handle as described previously. It will be understood that the grip member need not necessarily be v-shaped but simply must narrow towards a point where the wire may be retained in a relatively secure manner.

Referring to Figure 45 of the drawings there is shown an alternative construction of handle for a cable reel according to the invention. The cable reel handle has an opening 313 for through passage of a wire (not shown). The gripping portion 23 of the handle forms an acute angle with the base portion 21 of the handle so that the wire will be urged towards the narrowest point between the base portion and the grip portion. Again, this narrowest point is shown as a v-shape but the base portion and the grip portion must simply narrow to a point in which the wire or other such type of fencing cable or the like may be retained in a relatively secure manner.

Figure 46 shows an alternative construction of handle in which the base portion has a cylindrical receiving member 331 that is snap fitted on to a corresponding boss 333 on the flange 5. The base portions cylindrical receiving member 331 has an inwardly facing annular clip 335 that is urged outwards as the cylindrical portion moves over an outwardly projecting lip 337 on the corresponding boss. As the clip moves beyond the clip it will resiliently deform back to a rest configuration thereby securing the handle to the flange. In this way the handle will be provided flush with the flange.

In this specification the terms "comprise, comprises, comprised and comprising" and the terms "include, includes, included and including" are deemed totally interchangeable and should be afforded the widest possible interpretation throughout the specification.

The invention is in no way limited by the embodiments hereinbefore described and may be varied in both construction and detail within the scope of the claims.